

The following notes for the NET3012-IP Architectures and Solutions course are based on the Nokia MPLS (p/n 3HE02276AA) and Nokia Services Architecture (p/n 3HE02277AA) courses from the Alcatel-Lucent Service Routing Certification Program curriculum. These are copyrighted products of Nokia.

## Lab 2: IGP Routing

Or: Routing with static, default, and OSPF routes

### What you will do:

1. Verify continuity of lab configurations from one week to the next
2. Determine how to use ping options to set the source address of the ICMP echo request
3. Configure and verify operation of single-area OSPF for IGP reachability
4. Capture all configs using your terminal program's logging facility
5. Submit configs to Blackboard

### Things that you will need to know or learn:

1. Credentials for logging into the Nokia Edu labs (see previous lab)
2. Topology of the Nokia lab infrastructure (see previous lab)
3. CLI commands for configuring static / default routes; and OSPF routing
4. How to capture terminal output using the logging facility of your terminal emulator

### What you need to submit and when:

1. Complete the "Lab 2 Pre-lab" exercise on Blackboard, **before** your lab period.
2. Complete the in-lab part of the exercise (see below), **before** the end of your lab period.
3. Complete the "Lab 2 Post-lab" exercise and quiz on Blackboard, **before** the assigned due date for your lab section. This consists of implementing multi-area OSPF (core = area 0; outer area = pod#).

### Required Equipment:

- USB memory stick to save results for post-lab questions
- Hard-cover lab notebook, for reference during SBA at the end of the course.
- PC with internet access, Java, and terminal program; eg. Putty (Provided in T108)

### In-Lab Marks:

- [1 mark] Demo of end-to-end static & default routing across entire lab (incl system interfaces)
- [1 mark] Demo of correct OSPF routing within your set of 3 routers (incl system i/f)
- [1 mark] Demo of correct OSPF routing between nodes at the very periphery of different pods
- [1 mark] Demo of correct OSPF routing across entire lab (incl system interfaces)
- [1 mark] Submit complete router configs

The pre-lab is worth **20%**, the in-lab is worth **20%**, and the post-lab is worth **60%** of this lab, even though the number of points may not correspond to this weighting.

10% of your final mark is for labs done during the course of the semester.

### References and Resources:

- ebook and eTextbooks to which you will gain access via your Nokia and Adobe accounts
- Topology diagram (see first lab)
- Command reference (see below)
- MySRLab: remote-access lab facility hosted at the Nokia Kanata campus

## Addressing & Login Table

	Edu Lab 1	Edu Lab 2	Edu Lab 3
R1	.164	.196	.228
R2	.165	.197	.229
R3	.166	.198	.230
R4	.167	.199	.231
R5	.168	.200	.232
R6	.169	.201	.233
R7	.170	.202	.234
R8	.171	.203	.235
R9	.172	.204	.236
R10	.173	.205	.237
R11	.174	.206	.238
R12	.175	.207	.239

	<b>My</b> specific login information
EDU Lab # (1, 2, or 3)	
Individual login ID	
Corresponding password	

See Blackboard for a list of login IDs and passwords; write **yours** in the space above.

**Base IP address** is: **192.168.206.0/24**

## Command Reference

configure • router • router-id <32-bit-ID> # Let's use best practices! (Same as System i/f)  
configure • router • ospf • area <area-id> • interface <int-name>

show • router • ospf • area <area-id> [detail]

show • router • ospf • status

show • router • ospf • interface [detail]

show • router • ospf • neighbor [detail]

show • router • ospf • database [detail] # shows OSPF LSDB

## Notes on the SR7750 CLI

- A good way of capturing the important configuration details for submission is:
  - get to the **configure • router** level, then use the command **info**
- At any point during configuration, you can go **directly** to the **show** command and enter as many commands as you like; afterwards, simply type **exit** to return to the exact configuration level where you left off.
- **admin display-config** captures the *entire* configuration, which is more than sufficient for submitting to Blackboard

## Task 1: Verify continuity of lab configurations from one week to the next

Think about the configuration state at the end of last lab. Login to the routers in your pod and use the info and show commands to confirm that everything is as you left it: hostname, port states, interface addresses, and any static / default routes. Remember, the default routes were organized in a clockwise ring around the core.

- Step 1. Confirm proper operation of static and default routes across the entire lab network. You should be able to **reach any** address (including system interfaces) **from any** address. If necessary, work together as a group to get it all tested and working.

**CHECK POINT #1** Be prepared with ping output on your screen to prove connectivity for each diagonal i.e. R9-R12 and R10-R11.

## Task 2: Configure and verify operation of single-area OSPF for IGP reachability

- Step 1. Remove all the static and default routes. (**How** can you confirm this is done?)  
Step 2. Complete the OSPF configuration for full reachability within your pod (ie. 3 routers)  
Step 3. Confirm proper operation of OSPF between upper and lower halves of your lab (ie. between pods 1 & 3, pods 2 & 4). Think about what you can test between just the pair of pods. Work together with the people in the adjacent pod to get it working.  
Step 4. Confirm proper operation of OSPF across the entire lab network. You should be able to **reach any** address (including system interfaces) **from any** address. Work together as a group to get it all tested and working.

Verify your configuration by pinging across all directly connected segments, then pinging to every other address in the topology.

**CHECK POINT #2, #3, #4:** Be prepared with ping output on your screen to prove connectivity for each of steps 2, 3, 4 above.

## Task 3: Capture the configs for all your assigned routers

Using the logging facilities of your terminal program, capture the result of displaying each router's configuration. Save this to disk and *also* to an external drive (USB stick or other). Submit it to Blackboard. Remember to assign a hostname (use a format of *RouterNumber-AlgNetID* eg. R1-ande0001) !

## Task 4: (Time permitting) OSPF multi-area configuration

Get a head start on the post-lab activity by implementing multi-area OSPF, as noted on the first page.